XETEC

Super Graphix jr

A Printer Interface
for Commodore Computers

by Marty Flickinger

INSTRUCTION MANUAL

Xetec SuperGraphix jr owner's manual

Written by Marty Flickinger

Copyright © 1985 by Xetec, Inc.
All rights reserved

FIRST EDITION

Commodore C-64 and Vic 20 are trademarks of Commodore Business Machines

Xetec, Inc.
3010 Arnold Rd.
Salina, KS 67401

(913) 827-0685

USING THE SUPER GRAPHIX jr WITH VARIOUS PROGRAMS

Speedscript:

Interface switches: 12345678 ↑ ■■■■□□□■

Easy Script:

Setup #1 - Set switches 12345678 ↑ ■■■■□□□■
Select "MX-80" printer from list
Select "s" for serial

Setup #2 - Set switches 12345678 ↑ ■□□□□□□■
Select "CBM" printer from list

Script 64:

Setup #1 - Set switches 12345678 ↑ ■□□□□□□■
Select "EPSON" printer from list
Select "s" for serial

Setup #2 - Set switches 12345678 ↑ ■□□□□□□■
Select "COMMODORE" printer from list

PaperClip:

Setup #1 - Set switches 12345678 ↑ ■□□□□□□■
Select printer file best suited for your printer. If using the interface's NLQ, use "GEMINI-A-ALF"

Setup #2 - Set switches 12345678 ↑ ■□□□□□□■
Select "1525-P-ALF" printer file

Print Shop:

Setup #1 - Set switches 12345678 ↑ ■■■■□□□■
Use Commodore side of disk

Setup #2 - Set switches 12345678 ↑ ■■■■□□□■
Use non-Commodore side of disk
Go to "Setup" and pick your printer

Fontmaster:

Setup #1 - Set switches 12345678 ↑ ■■■■□□□■

This page
intentionally blank

TABLE OF CONTENTS

Introduction ii
Using this manual ii
Setting up the interface 1
Getting your first print-out 3
How to set the interface switches 3
 Setting the printer type 4
 The device number 5
 The four modes of operation 5
 The NLQ (Near Letter Quality) mode 6
Printing graphics and near letter quality 7
Using word processors and pre-packaged software 8
Printing from BASIC programs 8
Secondary addresses 10
Locking the interface 11
The Hex dump 11
The Tab command 12
The command channel 12
Listing BASIC programs or directories 14
A closer look at the four modes 15
More on NLQ (Near Letter Quality) 16

Appendices
 A. Trouble shooting 16
 B. Automatic line feeds 17
 C. Print width 17
 D. 1525 graphics commands 18
 E. Printer compatibility 19
 F. Screen dump programs 20
 G. Listing abbreviations 22
 H. Standard ASCII vs. Commodore ASCII 23
 I. Parallel connector pinout 24
 J. Glossary 25
 K. Specifications 25

Index 26

Switch summary/quick reference Back cover

INTRODUCTION

The Xetec Super Graphix jr printer interface for the Commodore family of computers combines many features that previously were not available in one interface. Congratulations on your choice!

Super Graphix jr features

- Micro buffer
- Support of all major printers
- Fast Commodore graphics
- Near letter quality built in
- 9 secondary addresses
- 8 Active switches
- 14 command channel options
- 7 printing modes
- Centronics compatible
- Selectable device number
- Selectable line feeds
- Compact enclosure with cabling

Your new interface will soon be printing things like:

This is the near letter quality mode

In fact, what you just read was printed using a jr.

USING THIS MANUAL

We have made every effort to make this manual easy to follow without neglecting any of the numerous features of this powerful interface. If at any point you get stuck, look for a sample program (they are boxed in for your convenience) or read the text again. Don't get discouraged if it just doesn't make sense. Come back to it later and it may be much clearer.

Everything you might need to know about your interface has been included in this manual. Most users, however, will only need to concern themselves with parts of the manual. Some of the appendices, for example, are a little more technical in nature and will probably be unimportant in most situations. Generally, the manual progresses from easy topics at the start to more complex ones near the end.

Any time you run into a problem, flip to appendix A on page 16 and find your problem in the left column of the table. The most likely cause or causes of your problem are listed in the right-hand column.

SETTING UP THE INTERFACE

Before you can try using any of your interface's special features you need to connect it properly to the rest of your system. Refer to figure 1 as you follow these steps:

- Turn off your printer, computer, and disk drive if you have one.
- For now, make sure all 8 switches on the interface are in the 'off' position:



- Plug the printer interface into the connector on the back of your printer. Make sure it's pushed in all the way. If your printer has clips on the sides of the connector, lock these onto the interface to keep it from coming loose.
- If you do not have a disk drive: Plug the round connector (on the end of the grey cable) into the serial port at the center of the backside of your computer. (The connector won't fit into anything but the serial port.)
- If you have a disk drive or two: Leave the disk drive plugged into the computer. Plug the round connector on the end of the grey interface cable into the empty connector on the back of your disk drive.
- Unplug your Datasette if you have one.
- Refer to figure 1. Find the little board on the end of the single wire (coming out of the interface cable). Attached to this board there should be a white connector. Plug this white connector into the cassette port on the back of your computer (it's the smallest of the three rectangular slots).
- Make sure that the board you just plugged in has its silver stripes on the top. If not, unplug it and flip it over.
- If you have a Datasette, plug it onto the board that you just plugged into the Datasette slot.

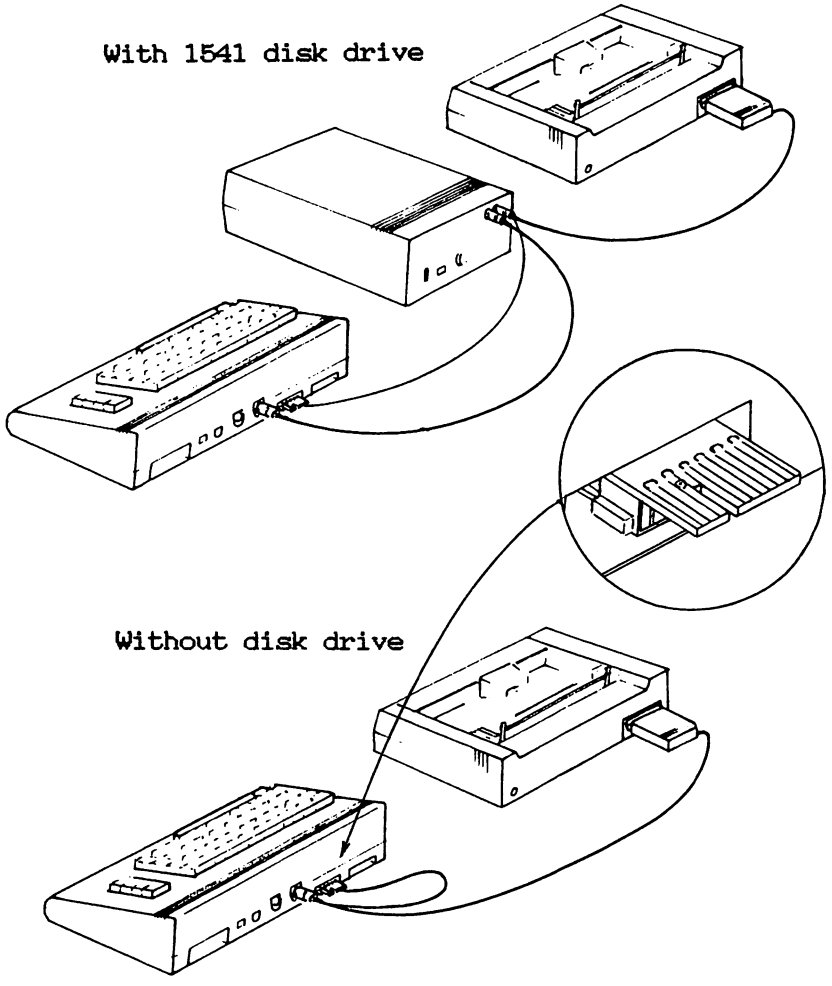


Fig. 1 Setting up the interface

GETTING YOUR FIRST PRINTOUT

Now that you have your system all connected properly (we hope), you need to turn the whole thing on. Do it in this order:

Power-up sequence
Printer
Disk drive (if you have one)
Monitor or TV
Computer

You are now ready to see what this new device you bought will do. Be sure to type the following lines exactly as they are shown, ending each one with a RETURN.

```
OPEN 1,4
PRINT#1,"IT WORKS"
```

If you got a ?SYNTAX ERROR, you typed something incorrectly. If nothing printed, go back through the set- up steps and make sure you followed every one correctly. If you get the same results the second time, consult appendix A on page 16 for help.

Before you can proceed with any of the nifty stuff, you have to take care of a little business. The interface needs to know what kind of printer it's hooked to. The next section describes how to tell it.

HOW TO SET THE INTERFACE SWITCHES

The eight switches on the interface control how it operates. Three of the switches tell the interface what kind of printer you have. The other five switches let you select different printing modes or other options. This section will tell you how to set the switches right now, and which ones you might want to change later.

At this time, let's point out that unlike dip-switches on other devices (like other printer interfaces, printers, etc.), the switches on the Super Graphix jr are active. Basically, this means that if you flip a switch, the interface sees that change and immediately puts that change into effect. No longer do you have to turn the interface off then back on to register the change. Just flip and go!

Setting the printer type

Switches 5, 6, and 7 must be set for your particular printer. Look through the following list for your printer and use the settings listed next to it to set the 3 switches shown.

PRINTER	SWITCHES
Axiom GX-100	ON ↑ □□□□■■■□
Banana	ON ↑ □□□□■■■□
Blue Chip M120/10	ON ↑ □□□□■■■□
Blue Chip M150/10	ON ↑ □□□□■■■□
Blue Chip M150/15	ON ↑ □□□□■■■□
BMC 80, 100	ON ↑ □□□□■■■□
Cal-Abco Legend	ON ↑ □□□□■■■□
C-Itoh 8510	ON ↑ □□□□■■■□
Daisy-wheel printers (all)	ON ↑ □□□□■■■□
Delta 10X, 15X	ON ↑ □□□□■■■□
Diablo P10i, P12, P32	ON ↑ □□□□■■■□
Epson (all 80 column models)	ON ↑ □□□□■■■□
Epson (all 132 column models)	ON ↑ □□□□■■■□
Gemini 10X, 15X	ON ↑ □□□□■■■□
NEC 8023	ON ↑ □□□□■■■□
Mannesmann Tally Spirit, MT160/180	ON ↑ □□□□■■■□
Mannesmann Tally MT1600/1800	ON ↑ □□□□■■■□
Okidata 82, 92 with Okigraph ROMs	ON ↑ □□□□■■■□
Okidata 84, 92, 93	ON ↑ □□□□■■■□
Panasonic KX-P1090, 1091, 1092	ON ↑ □□□□■■■□
Panasonic KX-P1093	ON ↑ □□□□■■■□
Prowriter	ON ↑ □□□□■■■□
Radix 10X, 15X	ON ↑ □□□□■■■□
Riteman	ON ↑ □□□□■■■□
SD-10, SD-15	ON ↑ □□□□■■■□
Siekosha GP-100	ON ↑ □□□□■■■□
SG-10, SG-15	ON ↑ □□□□■■■□
SR-10, SR-15	ON ↑ □□□□■■■□

If your printer isn't listed, try ON ↑ □□□□■■■□ since it is the most common setting.

Once you set these three switches, you will probably never need to change them unless you change printers. So once they are set, forget about them.

The device number

All devices connected to the computer's serial bus (such as printer interfaces and disk drives) are given their own device number. Printers are usually given a device number of 4. If you have a second printer, it is usually called device 5. Switch number 8 tells the interface which device number to use:

Device #	Switch 8
4	
5	

Unless you have two interfaces connected at the same time, you should set yours to device 4 by shutting switch 8 'off'.

Auto line feeds

When the computer is printing data to the printer and it wants to start a new line it sends what is called a 'carriage return' which literally means to return the carriage (or head) of the printer to the left side. But since a new line is to be started, the paper also needs to be moved up a line or the next line will overprint the first.

The auto line feed is a command from the interface to move the paper each time the carriage is returned. You can turn this funtion on or off with switch 2 on the interface:

Line Feed	Switch 2
Auto	
None	

To make things more complex, most printers have a switch that will allow the printer to do the same thing. If you turn on the auto line feeds on both the printer and the interface, you will get everything double-spaced. The best way to set things is to turn on auto line feeds in the interface (switch 2 off) and shut them off on your printer (refer to your printer's manual).

The four modes of operation

At this point, you should have switches 2, 5, 6, 7, and 8 set properly. With a few rare exceptions, most users can now forget about these switches and concentrate on switches 1, 3, and 4. These three will be the ones you will most often change to achieve

different printing results. First let's look at number 3 and 4 which set the interface's mode:

SWITCHES	MODE
ON ▯▯■■▯▯▯▯▯	1525 Emulation
ON ▯▯■▯▯▯▯▯▯	SuperGraphix jr mode
ON ▯▯■■▯▯▯▯▯	ASCII conversion
ON ▯▯■■▯▯▯▯▯	Transparent

Let's briefly describe what each of these modes does (for a detailed discussion, see 'A closer look at the four modes,' p. 15).

- 1525 Emulation - This mode makes your printer act exactly like Commodore's 1525 printer (except, perhaps, for being faster).
- SuperGraphix jr mode - This mode is close to the 1525 emulation mode, but it allows you to do a few more things (such as getting more readable BASIC listings and sending special control codes to your printer).
- ASCII conversion (pronounced ASK-EEE) - In this mode text in the Pet ASCII format is changed to text in the standard ASCII format (the one your printer uses). All other codes go right to your printer unchanged. For more info on Pet and standard ASCII, see appendix H on page 24.
- Transparent - In this mode, every code goes right through the interface to the printer unchanged (as in a transparent piece of glass).

Later, you will be instructed which mode to use in what situation, but for now remember this: if you are printing from BASIC, you will most likely want to use either 1525 emulation or Super Graphix jr.

The NLQ (Near Letter Quality) mode

Switch number 1 controls a slick feature called near letter quality (or NLQ) print. NLQ text looks almost as if it was printed with a typewriter or daisy-wheel printer. Here's how to set it:

NLQ mode	Switch 1
Off	ON ■▯▯▯▯▯▯▯▯
On	ON ▯■▯▯▯▯▯▯▯

Shut this switch off to print normal text and graphics; turn it on to get the high-quality NLQ print. A good example of using this switch is as follows: using a word processor, you could shut switch 1 off and print a document in normal text to see if it's okay,

then turn switch 1 on and print it again, this time in NLQ.

Well, that's all there is to setting the switches. It wasn't too tough, was it? A summary of all the switch functions is printed on the back cover for easy reference.

PRINTING GRAPHICS AND NEAR LETTER QUALITY

Since you had to sit through all that stuff about switches and modes and things, it's time to do something a little more exciting. Shut NLQ off and set the mode to SuperGraphix jr (▪ ▪▪▪▪▪▪▪▪). Now, let's see some graphics characters printed:

```
OPEN 2,4          (remember to hit RETURN)
PRINT#2,"♥♥♥♥"    (To get ♥, hold shift and push S)
CLOSE 2
```

Four hearts should have printed. If you get a bunch of gibberish, check to see that you have the printer type switches and the mode switches set correctly.

****NOTE: If you have set the printer switches all 'on' (▪ ▪▪▪▪▪▪▪▪ - the setting for daisy wheel printers), graphics characters cannot be printed.

Now try some other graphics characters or maybe mix text and graphics on the same line.

NLQ

If you're ready, we will try to print some near-letter-quality text. First, turn on the NLQ mode with switch 1 (▪ ▪▪▪▪▪▪▪▪). Then type the following lines (in this example, to get the lower case letters just type the letter; to get the capitals, hold shift and type the letter):

```
open 3,4,7
print#3,"This is NLQ.  Wow!"
close 3
```

****NOTE: If the text was printed in standard dot matrix, your printer may not be capable of printing NLQ (not all are). Check appendix E (page 19) for details.

USING WORD PROCESSORS AND PRE-PACKAGED SOFTWARE

This section deals with getting your interface to print correctly with software that you have bought (especially word processors). The next section will show you how to communicate with the interface in programs that you write.

Let it be said that this section in no way attempts to help you make a program print that isn't designed to. If that is your intention, you will need to read up on the next section and then modify the software that you want to print. The intent here is to teach you how to take software that has some provision for printing (be it text, pictures, or whatever) and use it and the interface in such a way that you get the desired print out correctly.

Their are basically two types of software you will encounter. First, there are those that ask you what printer you have, either with a menu (e.g. Easy Script) or with loadable printer files (as in Paper Clip). To make these programs print right, you can do one of two things:

- Tell it that you have the Commodore printer (it may go under the names 1525, CBM, or PET). Then set the interface in the 1525 Emulation mode (* ▯▯▯▯▯▯▯▯▯) and all should work great. You have the option of turning NLQ on or off.

- If your printer (or one that is compatible) is one of the options listed in your software, select that printer and set the interface in the transparent mode (* ▯▯▯▯▯▯▯▯▯) so that all the codes will go straight to the printer. You have the option of turning NLQ on or off.

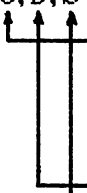
The second type of software you might run into never gives you any chance to select the type of printer you have. 99.9% of the time this means it is written for the 1525 printer. This type of software is easily made to work with the interface: just set the interface to the 1525 emulation setting (*▯▯▯▯▯▯▯▯▯) and the NLQ switch to your preference.

PRINTING FROM BASIC PROGRAMS

If you intend to write or modify BASIC programs that will use your printer, you will need to become familiar with four BASIC commands that allow you to talk to the printer. They are 'OPEN', 'CLOSE', 'PRINT#', and 'CMD'. Let's take a look at each one at a time.

■ The OPEN command must be used to open a channel to your printer before you can print data to it. It's about the same as dialing someone's number before you can talk to them on the phone. The format for the OPEN command is as follows:

OPEN C,D,S



C — Channel number. This can be any number you choose from 1 to 127. Whatever number you pick, you will use it later when you actually print data (you are just preparing to at this point).

D — Device number. This tells the computer what device you will be sending the data to. Your interface is either device 4 or 5 depending on how switch 8 is set. Four is the one normally used.

S — Secondary address. This number can be left off (then it would be OPEN C,D). If used, this number tells the interface what to do with the data you will be sending it. Different numbers here allow you to access the different features of your interface and printer. All the legal secondary addresses and what they do will be introduced on page 10.

```
OPEN 1,4      Opens channel 1 to the interface
OPEN 23,4,7   Opens channel 23 to the interface with
              secondary address 7
```

■ Once a channel has been 'OPEN'ed to your interface, the PRINT# command is used to actually send data to it (from there it goes to your printer and then gets printed). The format of this command is:

PRINT#C,"Your data to be printed goes here"



C — Channel number. This is that number from 1 to 127 that you picked in the OPEN command. You have to supply this number because more than one channel can be open at once, so you have to tell which channel to print through.

"..." — This is where you put the data you want

printed. This part is the same as in a regular PRINT command (except it goes to the printer).

```
PRINT#1,"I WANT THIS PRINTED"
PRINT#23,"THE ANSWER IS";A
```

■ The CLOSE command is used to undo an OPEN command. You don't have to close a channel until you are done sending all the data you want. The format is simple:

```
CLOSE C
```

C — Channel number that you chose in the OPEN command. This tells the computer exactly which channel to close (remember, more than one channel can be open at once).

```
CLOSE 1      Closes channel number 1
CLOSE 23     Closes channel number 23
```

■ The last of the four BASIC commands is CMD. This command tells the computer to send all data to a channel instead of the screen. This is especially useful for listing BASIC programs or disk directories to the printer. Here's how you would do it

```
OPEN 1,4     You must open a channel first
CMD 1        This means 'send everything to channel 1'
LIST         This will list the program to the printer
PRINT#1      This says 'send things to the screen now'
```

There are ways to make the interface list programs in different forms. For details, see 'Listing BASIC programs' on page 14.

SECONDARY ADDRESSES

Now that you are familiar with the OPEN command, it's time to let you know some of the options you can choose by using different secondary address numbers (the 7 in OPEN 1,4,7). Here is a list of the legal ones and what they make the interface do.

Secondary Address	Interface Function
0	Prints the data you send as upper case letters and graphics.
1	Same as 0 except no auto line feed is sent.
3	Hex dump. All data you print is dumped to the printer in a debug mode which will be explained later
4	Transparent. All the data you print goes directly to the printer regardless of the mode switches.
5	Same as 4 except no auto line feed is sent.
7	Prints the data you send as upper & lower case text and graphics.
8	Same as 7 except no auto line feed is sent.
15	Command channel. Instead of text to be printed, you send commands to the interface with this sec. address. See page 12.
20+	If you add 20 to any of the above numbers (except 15) the interface will be 'locked' in that mode. See the next section.

LOCKING THE INTERFACE

In some circumstances (such as using a word processor) you may want to 'lock' the interface into some mode. To do this, just open a channel with 20 added to its secondary address and print something. Here's an example:

```
OPEN 1,4,27        (Lock in sec. adddress 7)
PRINT#1            (Complete the lock)
```

THE HEX DUMP

If you OPEN a channel with a secondary address of 3, the value of each piece of data that's sent to the interface will be printed. In this mode, if you sent the word 'HI', the printer will print 48 49 0D. These are the hexidecimal values for 'H', 'I', and a carriage return. This mode is basically intended to help you debug your print routines because it shows the exact value of all data that you send to the interface. Appendix H on page 24 shows the decimal and Hexidecimal values for each character set.

TAB

Avoid using the TAB function in PRINT# statements. If you must use it, you must do this

```
PRINT#1,""TAB(5);"TEXT"
```

or Commodore's BASIC will give you a ? SYNTAX ERROR. Also, when using the TAB function, you must print your data through a channel that does not send auto line feeds (ones with secondary addresses of 1, 5, or 8). Consequently, every time you want to start a new line, you must send a line feed yourself - CHR$(10). This example should clear all this up.

```
10 REM TAB EXAMPLE
20 OPEN 1,4,8
30 PRINT#1,""TAB(5)"20TH"
40 PRINT#1,""TAB(20)"20TH"
50 PRINT#1,""TAB(10)"10TH"
60 PRINT#1,CHR$(10):REM GO TO NEXT LINE
70 CLOSE 1
```

THE COMMAND CHANNEL

As a review, different secondary addresses in the OPEN statements cause the interface to do different things with the data it receives. A very special case is secondary address 15 which is called the command channel. Unlike any other channels, the command channel looks at the data you send as commands, not stuff to be printed to the printer. The commands it recognizes select different options and some really special things. First, let's see how to use this channel, and then all of the commands will be described.

```
OPEN 1,4,15       Notice the Sec. address of 15
PRINT#1,"I"       The 'I' command is sent
```

If you got a ?FILE OPEN ERROR on line 1, type CLOSE 1 (RETURN) then try the two lines again.

When you get it to work, a short message (called the Identification) should be printed. That's what the 'I' command does - it identifies the model and revision of the interface you have.

Many people make the following mistake when they first try to use the command channel. Can you see what's wrong?

```
OPEN 1,4,15
PRINT#1,"I"
PRINT#1,"THE I COMMAND WORKS!"
```

The error above is that the last line is supposed to print "THE I COMMAND WORKS!" to the printer. What will happen, however, is the interface will look at it like a 'T' command, an 'H' command, an 'E' command etc. because you are sending it to the command channel. If you want to send commands and print text, do something like this:

```
OPEN 1,4,15
OPEN 2,4,7
PRINT#1,"I"
PRINT#2,"THAT'S MUCH BETTER!!!"
```

There is a total of 14 different commands that your command channel will recognize:

- U Unlock the interface. This will undo a lock that was forced by a secondary address of 20 or greater.
- I Print the interface's identification
- M Change how BASIC programs are listed. See p. 14
- V Change how BASIC programs are listed. See p. 14
- G Change how BASIC programs are listed. See p. 14
- A Change how BASIC programs are listed. See p. 14
- K Change how BASIC programs are listed. See p. 14
- 8 Start printing 8 lines per inch
- 6 Start printing 6 lines per inch
- SU Underline spaces as well as text
- SB Leaves spaces blank between underlined words.
- Wn Set the print width to n columns. See appendix C
- LD Disables listing mode (cannot list BASIC programs)
- LE Enable listing mode again

More than one command can be sent at one time. For example

```
OPEN 1,4,15
PRINT#1,"UI"
```

would unlock the interface and print the identificion. If an illegal command is sent, the interface will make the printer beep to let you know.

LISTING BASIC PROGRAMS OR DISK DIRECTORIES

As was shown before, the way to list a BASIC program or disk directory is as follows.

```
OPEN 1,4
CMD 1
LIST
PRINT#1
```

Graphics characters and control codes (such as cursor movements) can make a BASIC listing hard to read, especially if someone has to enter the program from the listing. To alleviate this problem, several different ways of listing graphics characters and control codes are available for you to use.

In the 1525 emulation mode, control codes will be listed as they look on the screen (a reverse heart, for example). In the SuperGraphix jr mode, however, control codes will be listed in what are called mnemonics (pronounced NEW-MONICS). The mnemonic for clear screen is [CLR]. It's easier to recognize and remember than an obscure graphic character. The M and V commands when sent to the command channel will specify which mode you would like them listed in (M for mnemonics or V for Video method).

When the computer is turned on, graphics characters are listed as they look on the screen, but they can be listed two other ways:

- Keystrokes. If you send 'K' to the command channel, the keystroke mode is selected. Keystrokes show what key presses produce that character. For example, a ♥ is listed as [SS] which means SHIFT- S while ▚ is listed as [C*] meaning C= *.

- ASCII values. If you send 'A' to the command channel, the ASCII listing mode is turned on. In this mode, graphics characters are listed like this: [176].

- Graphics. The 'G' command will return the listing mode to 'graphics'.

Example:
To list a program using mnemonics and keystrokes:

```
OPEN 1,4
OPEN 2,4,15
PRINT#2,"MK"
CMD 1
LIST
PRINT#1
```

A CLOSER LOOK AT THE FOUR MODES

This section gets a little more technical but more specific about the operation of the four modes the jr can be placed in. Don't worry if they make no sense to you. You can use the modes without actually knowing what they are doing. But the details are here, just in case.

1525 Emulation mode

This mode acts just like the 1525 printer. This means that the optional listing modes (ASCII, keystrokes, and mnemonics) will not work. Also, you cannot send special codes to your printer because the interface will block them in the emulation mode. The print width is held at 80 characters no matter how wide your printer is or what you set the width to. PET ASCII is of course converted to standard ASCII. You can use the NLQ feature with this mode.

SuperGraphix jr mode

In this mode, just about everything that the interface will do is enabled including all the listing modes, ASCII conversion, the near-letter-quality, and the print width is fully adjustable. Also, any codes that don't correspond to 1525 functions will be passed on through to the printer in case it will recognize it.

ASCII conversion mode

In this mode, nearly all features of the interface are turned off except for the command channel and the conversion from PET ASCII to standard ASCII.

Transparent mode

This mode is completely transparent, with the possible exception of an auto line feed being inserted after each carriage return (depending on switch 2). If the NLQ switch (1) is on, the interface will not be transparent but will print NLQ wih no ASCII conversion.

MORE ON NLQ

When the near-letter-quality mode is turned on, text is limited to a width of 80 columns. Attempts to go beyond 80 columns will result in the lines being cut short. Also, graphics characters are illegal when the NLQ mode is on. They are therefore converted to text characters.

Underlining

The underlining function in NLQ works the same as the underlining in many printers:

'On' codes - 27, 45, 1
'Off' codes - 27, 45, 0

```
(Turn switch 1 on)
OPEN 1,4,7
PRINT#1,CHR$(27)CHR$(45)CHR$(1);
PRINT#1,"This is underlined"
PRINT#1,CHR$(27)CHR$(45)CHR$(0);
PRINT#1,"and this isn't"
```

APPENDICES

A - TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSES
?SYNTAX ERROR ?FILE OPEN ERROR ?FILE NOT OPEN	These errors are the user's fault. Read the section on printing from BASIC.
Computer locks up when you try to print something	Interface not hooked up properly Printer is turned off Printer is not on line
Nothing ever prints (you just get 'READY')	Using wrong device number Printer is off or off line
?DEVICE NOT PRESENT	Using wrong device number, Interface cables not hooked up correctly
Lines printed on top of one another	Switch 2 is on, or using secondary addresses 1,5,8
Lines double-spaced	Your printer's auto line feed is on.

Printing garbage

Printer selection switches (5,6,7) set wrong
Using wrong mode

B - AUTOMATIC LINE FEEDS

Under certain conditions, the interface will or will not send an auto line feed after each carriage return. The following chart shows when to expect one:

Switches	Secondary Address 0	1	3	4	5	7	8
↑ ■■□□□□□□	x			x		x	
↑ ■■■□□□□□	x	x		x	x	x	x
↑ ■■□□□□□□							
↑ ■■■□□□□□	x	x		x	x	x	x

Auto line feed occurrences

C - PRINT WIDTH

In the context of this manual, what is meant by the print width is how wide the interface thinks the printer is. For example, if you have a 132 column printer but your interface's width is set to 80, you will never be able to go beyond the 80th column (the interface thinks that's all there is).

In the 1525 emulation mode, the width is fixed at 80 and there is no way to change it. In the Super Graphix jr mode the width defaults to 80 unless you set switches 4,5, and 6 like this ↑□□□■■■□□ (the 132 column Epson setting) in which case, it defaults to 132. If the width is at 80, you won't be able to print graphics beyond the 80th column. You will be able to print text past the 80th position. This allows you to use the printer's compressed mode.

In the ASCII conversion and transparent modes, the width function is not applicable. In these modes, your printer will start a new line when it is incapable of printing any farther.

Using the command channel, you can set the width to anything from 1 to 255. Do it like this:

```
OPEN 1,4,15
PRINT#1,"W"CHR$(25)
```

Change the 25 to whatever width you want. If you specify a width of zero, the width becomes infinite (is never checked).

D - 1525 GRAPHICS COMMANDS

In the 1525 emulation and SuperGraphix jr modes, the 1525's special graphics commands can be used. Note that if the NLQ mode is turned on, however, these commands are ignored.

CHR$(8) - Dot graphics
This command puts the interface into the dot graphics mode. When in this mode, if you send codes from 128 to 255, they will be printed as columns of dots.

CHR$(14) - Double width on
This command starts the double-width mode. If the dot graphics mode was on, it will be shut off. The double-width mode stays on until you shut it off with a CHR$(15). If you are trying to send code 14 to your printer, see the table below to find what code to send.

CHR$(15) - Double width off
This shuts off the double- width and the dot graphics modes. If you are trying to send a code 15 to your printer, see the following table to see what code you should actually send.

Switches	To get 14 send:	To get 15 send:
	14	20
	14	20
	31	30
	14	15
	14	15
	14	20
	14	20
	14	15

CHR$(16) - Tab
This command is used to specify where to start printing next. For example, to print 'HELLO' starting at the 19th column, PRINT#1,CHR$(16)"19HELLO".

CHR$(27)CHR$(16)CHR$(n1)CHR$(n2) - Dot tab
This command, only usable when the dot graphics mode (CHR$(8)) is on, specifies which dot column to start printing at next (number of dots instead of number of characters). The number of dots is calculated by n1 + n2 x 256. For example, to print an asterisk 300 dots from the left side, PRINT#1, CHR#(8); CHR$(27);CHR$(16);CHR$(44);CHR$(1);"*" (because 44 + 1 x 256 = 300),

CHR$(26)CHR$(n)CHR$(g) - Graphics repeat

This command can only be used while in the dot graphics mode. It repeats the dot graphic 'g' (must be at least 128) a total of 'n' times. For example, to print a bar 200 dots long:

```
OPEN 1,4
PRINT#1,CHR$(8)CHR$(26)CHR$(200)CHR$(255)
```

CHR$(17) - Cursor down mode

Temporarily switch to upper and lower case.

CHR$(145) - Cursor up mode

Temporarily switch to upper case.

CHR$(18) - Reverse on

This turns on reverse printing mode (white letters on black background).

CHR$(146) - Reverse off

Turn off reverse printing mode. If you don't shut it off, it will automatically turn off at the end of the current line.

E - PRINTER COMPATIBILITY

The following table shows what information is stored internally for each of the eight printer type settings. If your printer isn't listed in the chart on page 4, you might want to get out your printer manual and look for which of the settings below most closely matches your printer's functions. Then use that setting for switches 5, 6, and 7. If none of the settings is even close, use the last one (for daisy-wheel printers).

Function	567	567	567	567	567	567	567	567
Double width start	14	14	31	14	14	14	14	14
Double width stop	20	20	30	15	15	20	20	15
Carriage return shuts off double-width?	Yes	Yes	No	No	No	Yes	Yes	No
Set to 6 lines/inch	27	27	27	27	-	27	27	-
	50	50	54	65	-	50	50	-
Set to 9 lines/inch	27	27	27	27	-	27	27	-
	48	48	56	66	-	48	48	-
Set line feed to graphics size	27	27	27	27	8	27	27	-
	65	65	37	84	-	65	65	-
	7	7	57	49	-	7	7	-
	-	-	14	53	-	-	-	-

Function	567	567	567	567	567	567	567	567			
Dot graphics: bit 1 at bottom or top?	Bot	Bot	Top	Top	Top	Bot	Bot	-			
Dot graphics mode...	27	27	3	27	8	27	27	-			
	75	75	-	83	-	75	75	-			
...followed by	n	n	n	n	-	xxxx-	n	n	n	n	-
End graphics mode	-	-	3	-	15	-	-	-			
	-	-	2	-	-	-	-	-			
Graphics:											
Horizontal dots/inch	60	60	60	80	60	80	60	-			
Vertical dots/inch	216	144	144	144	-	216	216	-			
Capable of NLQ	Yes	Yes	No	Yes	No	Yes	Yes	No			
Print width	80	80	80	80	80	80	132	-			

F - SCREEN DUMP PROGRAMS

```
10 REM VIC-20 HI-RES SCREEN DUMP
20 REM TO PRINT AN IMAGE OF THE SCREEN, USE
30 REM 'GOSUB 63000' (OR 63001 FOR AN INVERSE DUMP)
40 REM ADD THESE LINES TO YOUR PROGRAM
63000 RV=0:GOTO 63010
63001 RV=1
63010 A=PEEK(36869)
63020 SM=(PEEK(36866)AND 128)*4+(A AND 112)*64
63030 IF A>239 THEN GM=32768:GOTO 63080
63040 A=A AND 15
63050 IF A<4 THEN GM=32768+A*1024:GOTO 63080
63060 IF A>11 THEN GM=A*1024-8192:GOTO 63080
63070 PRINT"ERROR":STOP
63080 CLOSE 99:OPEN 99,4
63090 PRINT#99:PRINT#99,CHR$(8)
63100 FOR X=175 TO 0 STEP-7:FOR Y=0 TO 22
63110 XS=X AND 7
63120 C=SM+Y*22+INT(X/8)
63130 C1=PEEK(C):C2=32:IF X>7 THEN C2=PEEK(C-1)
63140 FOR I=0 TO 7
63145 GW=PEEK(GM+8*C2+I)*256+PEEK(GM+8*C1+I)
63150 GB=INT(GW/(2↑(7-XS)))
63153 GB=GB-128*INT(GB/128)
63155 IF RV=1 THEN GB=255-GB
63160 PRINT#99,CHR$(GB OR 128);:NEXT I,Y
63170 PRINT#99:NEXT X
63180 PRINT#99:CLOSE 99:RETURN
```

```
10 REM C-64 HI-RES DUMP.  RUN THIS PROGRAM TO
20 REM CREATE THE MACHINE LANGUAGE DUMP ROUTINE.
30 REM THEN, WHENEVER YOU WANT A DUMP, JUST ENTER
40 REM THE COMMAND SYS 52992
50 REM IF YOU DONT HAVE AN IMAGE CREATED IN THE
60 REM BIT MAP AREA, THIS ROUTINE WILL JUST
70 REM PRINT 'SNOW'.  (THE PAGE NUMBER OF THE
80 REM START OF THE BIT-MAP IS IN LOCATION 53244.)
90 AD=52992:EL=130
100 READ A$:EL=EL+10:FOR J=1 TO 35 STEP 3
110 V$=MID$(A$,J,1):GOSUB 1000:P=V*16
120 V$=MID$(A$,J+1,1):GOSUB 1000:P=P+V
125 IF P>255 THEN PRINT"ERROR IN LINE";EL
130 POKE AD,P:AD=AD+1:NEXT J:GOTO 100
140 DATA A9 00 20 BD FF A9 04 A2 04 A0 FF 20
150 DATA BA FF 20 C0 FF A2 04 20 C9 FF EA EA
160 DATA EA EA EA EA EA A9 08 20 D2 FF EA
170 DATA EA A0 00 A2 00 8E F9 CF A9 01 8D FA
180 DATA CF A9 06 20 76 CF 38 E9 01 10 F8 E8
190 DATA AD FA CF 20 D2 FF AD F9 CF F0 06 E0
200 DATA 40 B0 0D 90 DF E0 00 D0 DB A9 01 8D
210 DATA F9 CF D0 D4 A9 0D 20 D2 FF 98 18 69
220 DATA 07 A8 C0 C7 90 C1 A2 03 20 C9 FF 60
230 DATA EA EA EA EA EA EA EA EA EA 8D FB
240 DATA CF 98 48 8A 48 98 18 6D FB CF A8 A9
250 DATA 00 85 FC C0 C8 90 06 18 90 5F EA EA
260 DATA EA 98 29 F8 85 FB 06 FB 26 FC 06 FB
270 DATA 26 FC 18 65 FB 85 FB A9 00 65 FC 85
280 DATA FC 06 FB 26 FC 06 FB 26 FC 06 FB 26
290 DATA FC 8A 29 F8 18 65 FB 85 FB AD F9 CF
300 DATA 65 FC 85 FC 98 29 07 18 65 FB 85 FB
310 DATA AD FC CF 65 FC 85 FC 8A 29 07 AA E8
320 DATA A9 00 38 6A CA D0 FC 8D FD CF A0 00
330 DATA B1 FB 18 2D FD CF F0 01 38 2E FA CF
340 DATA 68 AA 68 A8 AD FB CF 60 EA 01 80 00
350 DATA 20 01 EA 77 *
1000 IF V$="*" THEN STOP
1010 V=ASC(V$)-48:IF V>10 THEN V=V-7
1020 RETURN


10 REM LO-RES SCREEN DUMP FOR VIC OR C-64
20 OPEN 15,4,15,"LD"
30 OPEN 4,4,0:REM 4,4,7 FOR UPPER/LOWER CASE
40 BS=7680:YL=22:XL=21:REM VIC VERSION
40 BS=4096:YL=22:XL=21:REM EXPANDED VIC VERSION
40 BS=1024:YL=24:XL=40:REM C-64 VERSION
50 FOR Y=0 TO YL:FOR X=0 TO XL-1
60 A=PEEK(BS+X+XL*Y)
70 IF A>127 THEN PRINT#4,"[RVON]";:RF=1:A=A-128
80 IF A<32 THEN A=A+64:GOTO 100
90 IF A<64 THEN 100
95 A=A+32:IF A>=128 THEN A=A+32
```

```
100 PRINT#4,CHR$(A);:IF RF THEN PRINT#4,"[RVOF]";:RF=0
110 NEXT X:PRINT#4:NEXT Y:CLOSE4
120 PRINT#15,"LE":CLOSE15
```

G - LISTING ABBREVIATIONS

- Control Codes

ASCII	V Mode	M Mode	Key
5	■	[WHT]	White
8	■	[DISH]	Disable Shift
9	■	[ENSH]	Enable Shift
14	■	[SWLC]	Switch to lower case
17	■	[DOWN]	Cursor down
18	■	[RVON]	Reverse on
19	■	[HOME]	Home cursor
20	■	[DEL]	Delete
27	■	[ESC]	Escape
28	■	[RED]	Red
29	■	[RGHT]	Cursor right
30	■	[GRN]	Green
31	■	[BLU]	Blue
129	■	[ORNG]	Orange
133	■	[F1]	Function 1
134	■	[F3]	Function 3
135	■	[F5]	Function 5
136	■	[F7]	Function 7
137	■	[F2]	Function 2
138	■	[F4]	Function 4
139	■	[F6]	Function 6
140	■	[F8]	Function 8
141	■	[SHRT]	Shifted return
142	■	[SWUC]	Switch to upper case
144	■	[BLK]	Black
145	■	[UP]	Cursor up
146	■	[RVOF]	Reverse off
147	■	[CLR]	Clear screen
148	■	[INST]	Insert
149	■	[BRWN]	Brown
150	■	[LRED]	Light red
151	■	[GRY1]	Grey 1
152	■	[GRY2]	Grey 2
153	■	[LGRN]	Light green
154	■	[LBLU]	Light blue
155	■	[GRY3]	Grey 3
156	■	[PUR]	Purple
157	■	[LEFT]	Cursor left
158	■	[YEL]	Yellow
159	■	[CYAN]	Cyan

- Graphics Characters

G Mode	K Mode	A Mode	G Mode	K Mode	A Mode
─	[S*]	[192]		[S]	[160]
♠	[SA]	[193]	▌	[CK]	[161]
─	[SB]	[194]	▀	[CI]	[162]
─	[SC]	[195]	▔	[CT]	[163]
─	[SD]	[196]	▁	[C@]	[164]
─	[SE]	[197]	▏	[CG]	[165]
─	[SF]	[198]	▒	[C+]	[166]
─	[SG]	[199]	▕	[CM]	[167]
─	[SH]	[200]	▓	[C#]	[168]
╱	[SI]	[201]	◤	[S#]	[169]
╲	[SJ]	[202]	▕	[CN]	[170]
╲	[SK]	[203]	├	[CQ]	[171]
┗	[SL]	[204]	▪	[CD]	[172]
╱	[SN]	[205]	┗	[CZ]	[173]
╲	[SM]	[206]	┐	[CS]	[174]
┗	[SO]	[207]	▬	[CP]	[175]
┓	[SP]	[208]	┌	[CA]	[176]
●	[SQ]	[209]	┴	[CE]	[177]
─	[SR]	[210]	┬	[CR]	[178]
♦	[SS]	[211]	┤	[CW]	[179]
─	[ST]	[212]	▕	[CH]	[180]
╲	[SU]	[213]	▌	[CJ]	[181]
╳	[SV]	[214]	▁	[CL]	[182]
○	[SW]	[215]	▔	[CY]	[183]
♠	[SX]	[216]	▬	[CU]	[184]
─	[SY]	[217]	▬	[CO]	[185]
♦	[SZ]	[218]	┘	[S@]	[186]
+	[S+]	[219]	▪	[CF]	[187]
▒	[C-]	[220]	▪	[CC]	[188]
─	[S-]	[221]	┘	[CX]	[189]
π	[PI]	[222]	▪	[CV]	[190]
◥	[C*]	[223]	▪	[CB]	[191]

H - PRINTER CONNECTOR PINOUT

PIN#	FUNCTION
1	Data strobe
2	Data bit 0
3	Data bit 1
4	Data bit 2
5	Data bit 3
6	Data bit 4
7	Data bit 5
8	Data bit 6
9	Data bit 7
11	Busy
31	Printer Reset
16	Ground
19-30	Ground

I - STANDARD ASCII VS. PET ASCII

Dec.	Hex	Standard	PET	Dec.	Hex	Standard	PET
32	20	space	space	77	4D	M	m
33	21	!	!	78	4E	N	n
34	22	"	"	79	4F	O	o
35	23	#	#	80	50	P	p
36	24	$	$	81	51	Q	q
37	25	%	%	82	52	R	r
38	26	&	&	83	53	S	s
39	27	'	'	84	54	T	t
40	28	(	(	85	55	U	u
41	29	)	)	86	56	V	v
42	2A	*	*	87	57	W	w
43	2B	+	+	88	58	X	x
44	2C	,	,	89	59	Y	y
45	2D	-	-	90	5A	Z	z
46	2E	.	.	91	5B	[	[
47	2F	/	/	92	5C	\	\
48	30	0	0	93	5D	]	]
49	31	1	1	94	5E	^	^
50	32	2	2	97	61	a	A
51	33	3	3	98	62	b	B
52	34	4	4	99	63	c	C
53	35	5	5	100	64	d	D
54	36	6	6	101	65	e	E
55	37	7	7	102	66	f	F
56	38	8	8	103	67	g	G
57	39	9	9	104	68	h	H
58	3A	:	:	105	69	i	I
59	3B	;	;	106	6A	j	J
60	3C	<	<	107	6B	k	K
61	3D	=	=	108	6C	l	L
62	3E	>	>	109	6D	m	M
63	3F	?	?	110	6E	n	N
64	40	@	@	111	6F	o	O
65	41	A	a	112	70	p	P
66	42	B	b	113	71	q	Q
67	43	C	c	114	72	r	R
68	44	D	d	115	73	s	S
69	45	E	e	116	74	t	T
70	46	F	f	117	75	u	U
71	47	G	g	118	76	v	V
72	48	H	h	119	77	w	W
73	49	I	i	120	78	x	X
74	4A	J	j	121	79	y	Y
75	4B	K	k	122	7A	z	Z
76	4C	L	l				

J - GLOSSARY

1525: Commodore's printer
Active switches: Switches that are constantly checked for changes.
ASCII: American Standard Code for Information Interchange.
Auto line feed: A line feed inserted after carriage returns to achieve proper vertical spacing.
Buffer: A chunk of memory whose function is to increase printing speed of graphics.
Command channel: A special channel (exclusively on Xetec interfaces) that allows you to control the interface with a multitude of commands.
Device #: The unique number given to your interface to which it (and only it) responds.
Emulation: Acting exactly like another device.
Keystrokes: A listing mode in which the key-presses that produce a character are listed instead of the character itself.
Mnemonics: Abbreviations for graphics and control characters which are easily remembered and recognized.

K - SPECIFICATIONS

Model name	Super Graphix jr
Printing modes	Text, NLQ, Commodore graphics
Character sets	96 Text 68 Graphics 96 NLQ
Input format	Commodore IEC serial
Output format	8-bit Centronics
Handshaking	STROBE and BUSY
RAM	112 bytes
ROM	8192 bytes
Firmware language	6805 machine
Power-up self test	ROM checksum and RAM test
Power requirements	
Voltage	5V regulated
Current	70 to 80 ma
Dimensions	2.7"(W)x3.6"(D)x.8"(H)
Serial cable length	5' 6"
Weight	6 oz.

INDEX

Abbreviations 14,22
ASCII 23
ASCII conversion 6,15
ASCII list mode 14,23
Auto line feeds 5,17
Channel number 9
CLOSE command 10
CMD command 10
Command channel 12
 Commands 13
Device number 5,9
Dot graphics 18
Dot tab command 18
Double width 18
Easy Script 8
Graphics 7
Graphics repeat command 19
Hex dump 11
Keystroke list mode 14,23
Line feeds 5,17
Listing programs 14,22
Locking the interface 11
Mnemonics 14,22
Modes
 1525 emulation 6,15,18
 SuperGraphix 6,15
 ASCII conversion 6,15
 Transparent 6,15
Near letter quality 6,7,16
NLQ 6,7,16
OPEN command 9
Paper Clip 8
PET ASCII 23
Pin out 24
Power-up 3
PRINT# command 9
Printers 4
Reverse printing 19
Screen dumps
 Lo-Res 21
 C-64 Hi-Res 21
 Vic 20 Hi-Res 20
Secondary address 9,10,11
Set up 1
SuperGraphics jr mode 6,15
Switches 3,Back cover
 #1 - 6,17
 #2 - 5,17
 #3,4 - 6,8
 #5,6,7 - 4,19
 #8 - 5

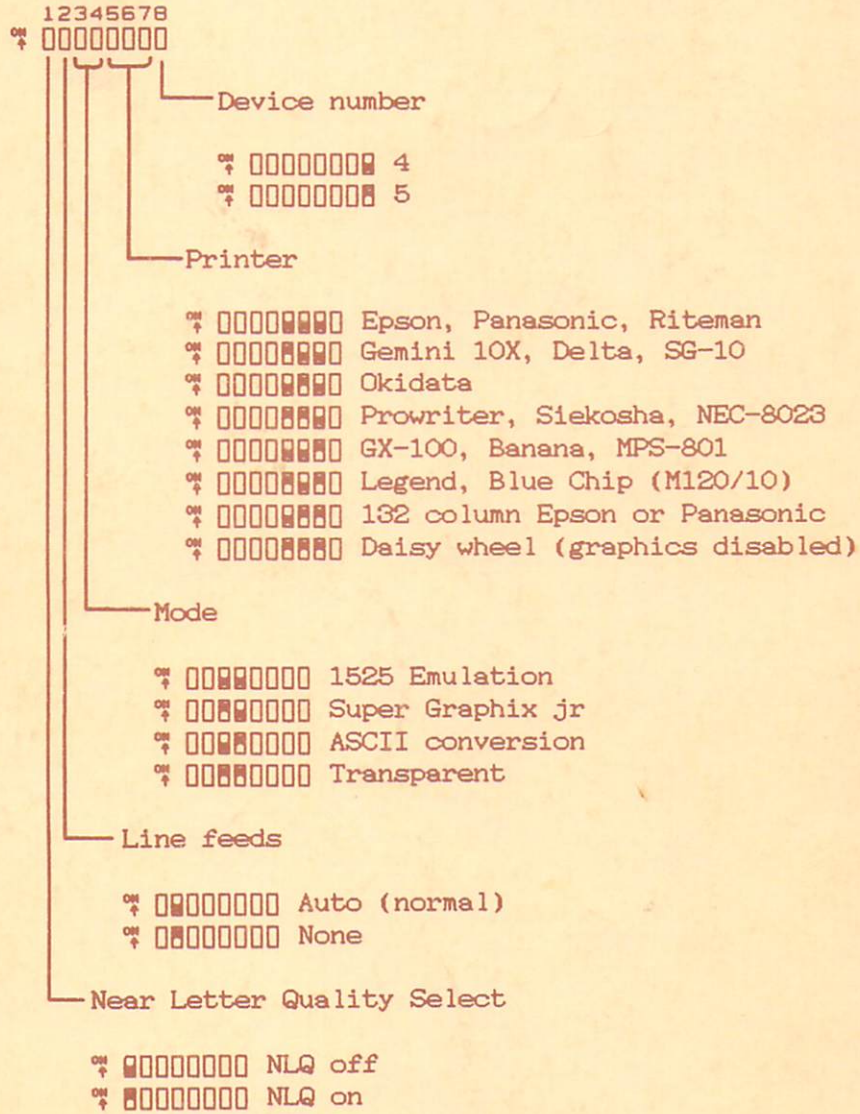
(Index cont. on back flap)

NOTES:

NOTES:

SUPER GRAPHIX JR

Switch Function Summary



TAB command 12
Transparent mode 6,15
Trouble shooting 16
Turn-on sequence 3
Underlining 16
Unlocking the interface 13
Video list mode 14,22
Width 16,17
Word processors 8

SECONDARY ADDRESSES

0	Upper case/graphics
1	Upper case/graphics (no line feed)
3	Hex dump
4	Transparent
5	Transparent (no line feed)
7	Upper/lower case
8	Upper/lower case (no line feed)
15	Command channel
20+	Lock the interface

COMMAND CHANNEL COMMANDS

U	Unlock the interface
I	Print the interface identification
M	List control characters in mnemonics - [CLR]
V	List control characters as inverse graphics
G	List graphics characters as graphics - ♥
A	List graphics characters as ASCII values - [173]
K	List graphics characters as keystrokes - [SM]
8	Set line spacing to 8 lines per inch
6	Set line spacing to 6 lines per inch
SU	Underline spaces as well as text
SB	Leave spaces blank between underlined words
Wn	Set the width to 'n' columns
LD	Disables the listing mode (cannot list programs)
LE	Enables the listing mode again

FEATURES OF THE FOUR MODES

	1525	SG jr	ASCII conv.	Trans.
ASCII conversion	X	X	X	-
Graphics commands	X	X	-	-
Adjustable width	80	X	-	-
Listing mode	X	X	-	-
Listing options	-	X	-	-
Command channel	X	X	X	-